Exhibit H

Exhibit E-5

INVALIDITY CONTENTIONS FOR U.S. PATENT NO. 7,177,369 BASED ON MINN ("MINN")

Based upon Plaintiff's Complaint, Infringement Contentions, and apparent claim constructions and application of the claims to Defendant's accused products, as best as they can be deciphered, the reference charted below anticipates or at least renders obvious the asserted claims. These invalidity contentions are not an admission by the Defendant that the accused products are covered by or infringe the asserted claims, particularly when these claims are properly construed and applied. These invalidity contentions are not an admission that the Defendant concedes or acquiesces to any claim construction implied or suggested by Plaintiff's Complaint or Infringement Contentions. Nor is Defendant asserting any claim construction positions through these charts, including whether the preamble is a limitation. The portions of the prior art reference cited below are not exhaustive but are exemplary in nature.

H. Minn and V. K. Bhargava, "An investigation into time-domain approach for OFDM channel estimation," in IEEE Transactions on Broadcasting, vol. 46, no. 4, pp. 240-248, Dec. 2000, doi: 10.1109/11.898744. This paper is prior art under at least 35 U.S.C. § 102(a)(b) and 103(a). As described in the following claim chart, the asserted claims of U.S. Patent No. 7,177,369 (the "'369 Patent"), are invalid as anticipated by Minn.

To the extent that Minn is found not to anticipate one or more of the asserted claims of the '369 Patent, these claims are invalid as obvious in view of Minn alone or in combination with other prior art references disclosed in Defendant's Invalidity Contentions and accompanying charts, including without limitation as set forth below.

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Claim 1	
1[p] A method comprising:	To the extent the preamble is limiting, Minn discloses this claim limitation explicitly, inherently, or as a matter of common sense, or it would have been obvious to add missing aspects of the limitation. For example, see the following passages and/or figures, as well as all related disclosures: Minn describes OFDM in view of known systems such as "high rate wireless LAN standards such as ETSI HiperLAN 2 and IEEE 802.11(a), and multimedia wireless services such as Japanese MMAC (Multimedia Mobile Access Communications)"

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	Minn teaches a conventional OFDM system with pilot tones per the excerpt below: II. System Description Suppose the pilot tones $P[k]$ are multiplexed with data $D[k]$ in all OFDM symbols at a pilot ratio $1/K$ (ratio of the number of pilot tones to the total number of subcarriers) where k is subcarrier index $(0, 1, \cdots, N-1)$ with N being the total number of subcarriers, and $P[k]$ and $D[k]$ are zeros except at their corresponding subcarriers. Then the transmitted OFDM signal in discrete-time domain, excluding guard-interval, can be expressed as $$s[n] = IFFT_N\{P[k]\} + IFFT_N\{D[k]\} = p[n] + d[n] \quad (1)$$

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	where $IFFT_N\{\}$ is N-point inverse Fast Fourier transform and n is the time-domain index $(0, 1, \cdots, N-1)$ of an OFDM symbol. Suppose the wireless channel has a discrete-time impulse response given by $$h[n] = \sum_{l=0}^{L-1} \alpha_l \, \delta[n - \tau_l]) \quad (2)$$ where α_l is complex path gain of lth path, τ_l is the delay of lth path, and L is the total number of channel paths. For simplicity, time dependence nature of the channel impulse response is suppressed in the notation. After passing through a multipath wireless channel, the time-domain received samples of an OFDM symbol, if appropriate cyclic prefix guard samples are used, is given by $$r[n] = s[n] \otimes h[n] + w[n] \quad (3)$$ where $\otimes$ represents N-point circular convolution, $\{w[n]\}$ are independent and identically distributed (*iid*) AWGN samples with zero mean and variance of σ_t^2. Assuming perfect synchronization, the FFT output frequency-domain subcarrier symbols can be expressed as $$R[k] = FFT_N\{r[n]\} = H[k]\,P[k] + H[k]\,D[k] + W[k] \quad (4)$$ where $W[k] = FFT_N\{w[n]\}$ is frequency-domain AWGN noise samples with zero mean and variance $\sigma_f^2 = N\sigma_t^2$. Then the channel frequency response at the pilot tones can be estimated by $$\hat{H}[m] = \frac{R[m]}{P[m]} = H[m] + \frac{W[m]}{P[m]} \quad (5)$$ where m is the subcarrier index for pilot tones. This channel estimate is called LS (least square) estimate. The channel responses at other subcarriers can be obtained by interpolation. Minn at 240-241. Minn teaches as one alternative a "MOST SIGNIFICANT TAPS APPROACH" wherein "For **practical multipath wireless channels**, there are **not so many channel paths** with **significant energy**

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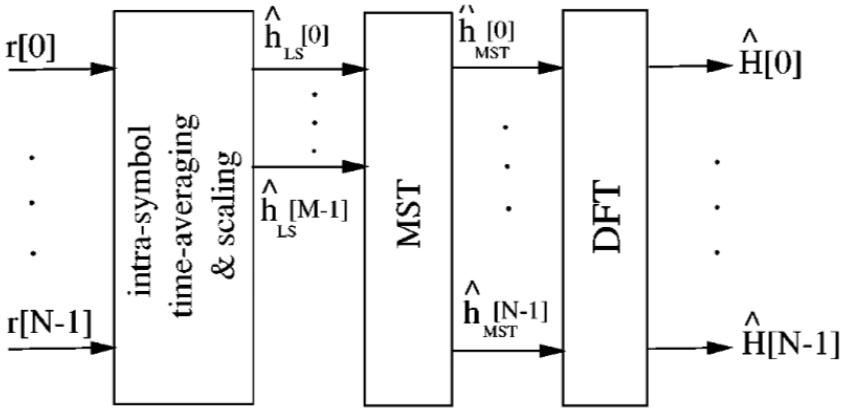
	(if compared to the FFT size N). Hence, among N samples (taps) of the **channel impulse response estimate**, many samples (taps) will have little or no energy at all except noise perturbation" and accordingly, "**neglecting those nonsignificant channel estimate taps** can **improve the channel estimation performance significantly** and this fact is applied in the proposed method as shown in Fig. 1". Minn at 242.  Fig. 1. Most Significant Taps (MST) Method. Minn Fig. 1, p. 242. More specifically, Minn teaches for the MST of Fig. 1 that "**If the maximum channel delay spread is less than the length of an identical part**, which can be designed to satisfy this, then the **time-domain received samples** corresponding to the time-domain pilot samples **contain *K* parts, each representing a scaled channel impulse response for the respective part** corrupted by AWGN" as further explained in the excerpt below. Minn at 242-243.

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	$$r[n] = h[n] \otimes p[n] + w[n] = \frac{A}{K}\sum_{m=0}^{K-1} h[n-mM] + w[n], \quad n = 0,1,\cdots,N-1 \quad (20)$$ After averaging, we have the noise-corrupted scaled channel impulse response $$r_{avg}[n] = \frac{A}{K}h[n] + w_{avg}[n], \quad n = 0,1,\cdots,M-1 \quad (21)$$ Then the raw channel impulse response estimate is given by $$\hat{h}_{LS}[n] = \frac{K}{A}r_{avg}[n] = h[n] + \frac{K}{A}w_{avg}[n], \quad n = 0,1,\cdots,M-1 \quad (22)$$ Now, the most significant J channel taps are chosen as the J largest amplitude channel taps. Let the channel tap indexes for those most significant J taps be denoted by $n_0, n_1, \cdots, n_{J-1}$. Then the time-domain channel impulse response estimate of proposed MST method is obtained by setting the other channel tap gains to zero as shown below: $$\hat{h}_{MST}[n] = \sum_{i=0}^{J-1} \hat{h}_{LS}[n_i]\,\delta[n-n_i], \quad n = 0,1,\cdots,N-1 \quad (23)$$ The channel frequency response estimate is directly obtained by applying *FFT* to $\{\hat{h}_{MST}[n]\}$ as $$\hat{H}_{MST}[k] = FFT_N\{\hat{h}_{MST}[n]\}, \quad k = 0,1,\cdots,N-1 = H[k] - H_{res}[k] + W_{avg}[k] \quad (24)$$ where $$H[k] = \sum_{n=0}^{N-1} h[n]\,W_N^{kn}$$ $$H_{res}[k] = \sum_{l=0}^{N-J-1} h[n_l']\,W_N^{kn_l'}$$ $$W_{avg}[k] = \frac{K}{A}\sum_{i=0}^{J-1} w_{avg}[n_i]\,W_N^{n_i k}$$ with $\{n_i\}$ being the most significant channel tap indexes and $\{n_l'\}$ being the indexes of the other channel taps. Minn at 243. In the terminology of the '369 Patent, Minn teaches "***identifying at least one multipath transmission delay within a reverse path data signal received from a receiving device***" by the process of calculating "$\hat{h}_{LS}[n]$" (each "$\hat{h}_{LS}$" being a "***multipath transmission delay***" for its corresponding "**time-domain index**" "n") shown above and Minn teaches "***determining at least one forward path pre-equalization parameter based on said at least one transmission delay***" by the process of calculating "$\hat{H}_{MST}[k]$" shown above (to the extent that a combination with another base reference uses the frequency domain response "$\hat{H}_{MST}[k]$" for "***forward path pre-equalization***" where "k" is "subcarrier index") Minn concludes that "In terms of **BER performance in multipath fading channels**, **MST without channel energy missing** and LMMSE approaches have almost the **same performance** which is better than the other considered approaches" but "In terms of **complexity**, **MST approach keeps minimum complexity** among the considered methods". Minn at 247.

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	Thus, Minn encourages the use of a "Time-Domain Approach for OFDM Channel Estimation" instead of conventional "frequency domain" approaches. See Minn at Abstract ("A time-domain based channel estimation for OFDM system with pilot-data multiplexed scheme is investigated. As an approximation to linear minimum mean square estimator (LMMSE), a time-domain based channel estimation is proposed where intra-symbol time-averaging and most significant channel taps selection are applied.") Minn at 240 ("Orthogonal frequency division multiplexing (OFDM) [1]–[3] has recently achieved much popularity due to its desirable properties such as its robustness to multipath delay spread and impulse noise, its high data rate transmission capability with high bandwidth efficiency, and its feasibility in application of adaptive modulation and power allocation across the subcarriers according to the channel conditions.") Minn at 240 ("Pilot tones can be inserted in all subcarriers of a particular OFDM symbol forming an OFDM training symbol, in which case training symbols are transmitted at an appropriate regular rate determined by the time varying nature of the wireless channel. Another approach is that, instead of using all subcarriers, the pilot tones are multiplexed with data to form OFDM symbols. The subcarrier spacing between pilot tones is usually determined by the frequency selectivity of the wireless channel. The pilot multiplexing can be allowed for all OFDM symbols (i.e., all the time of transmission) or at an appropriate rate depending on the time selectivity of the wireless channel. In channel estimation using training symbols, decision directed approach has to be used. If complexity is affordable, time interpolation (e.g., [11]) can be used to improve the performance. If pilot tone multiplexing is used, the frequency interpolation has to be performed [12]–[14]. Similarly, time domain interpolation can be performed at the cost of complexity. Most of the channel estimation approaches may be viewed as DFT-based approaches [15], [16], [10], [11], where LS (Least square) channel (frequency response) estimates are fed to IFFT block to get time domain channel impulse response estimate, and then appropriately processed and transformed back to frequency domain by FFT. A DFT-based approach for OFDM system with transmit and receive antenna diversity has been discussed in [10].")

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	Minn at 240 ("In this paper, we investigate a time-domain channel estimation approach, namely FPTA (Frequency Pilot Time Average) [17] which applies intra-symbol time-domain averaging of identical parts of the pilot signal. We also propose a time-domain approach for OFDM channel estimation which achieves performance gain over LS or FPTA approaches.") See Section III describing FPTA method. See Minn at 243 ("The choice of the number of most significant taps in the channel estimation depends on the application scenario. Broadcasting environment such as single frequency network can have larger number of multipaths with significant energy than nonbroadcasting cases such as wireless LAN's environment. In any case, should be chosen larger than the (designed) number of multipaths in order to prevent channel estimation error caused by missed channel taps. The channel estimation error caused by the noise from an additional tap in channel estimation is much less than that caused by missing one of the multipaths. A suitable choice for may be two times or more of the (designed) number of multipaths (as will be seen in the simulation results) in order to ensure no channel energy missing. Another MST tap selection approach can be implemented by selecting the channel taps whose energy is above a threshold. The threshold may be set as times the maximum channel tap's energy in the raw channel estimate. The suitable choice of depends on the operating SNR and more details will be discussed in the simulation results section") See Minn at 244 ("The difference between proposed MST approach and its dual form DFT-based approach is that MST uses pilot-data multiplexed approach while its dual form DFT based approaches use training symbol approach. It can be shown that the potential gain of the latter approach is . Using total pilot power of , the latter approach achieves potential gain of whereas MST achieves potential gain of with total pilot power of ; hence, on the basis of the same total pilot power, both methods have the same potential gain for channel estimation. Another difference is the complexity. In MST approach, operations involved are time-averaging, most significant channel taps selection and one FFT operation whereas its dual form DFT-based approach requires LS estimation, one IFFT operation, most

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	significant channel taps selection and one FFT operation. Hence, the proposed MST approach saves some complexity.") One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation and OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
1[a] identifying at least one multipath transmission delay within a reverse path data signal received from a receiving device;	Minn discloses identifying at least one multipath transmission delay within a reverse path data signal received from a receiving device. For example, see the following passages and/or figures, as well as all related disclosures: See discussion in 1[p] explaining Minn approach for time-domain approach for OFDM channel estimation. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.

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1[b] determining at least one forward path pre-equalization parameter based on said at least one transmission delay; and	Minn discloses determining at least one forward path pre-equalization parameter based on said at least one transmission delay. For example, see the following passages and/or figures, as well as all related disclosures: See discussion in 1[p] explaining Minn approach for time-domain approach for OFDM channel estimation and determination of at least one forward path pre-equalization parameter based on at least one transmission delay. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation and OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
1[c] modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter, where said modifying includes selectively setting different transmission power levels for at least	Minn discloses modifying a forward path data signal that is to be transmitted to the receiving device based on said at least one forward path pre-equalization parameter, where said modifying includes selectively setting different transmission power levels for at least two Orthogonal Frequency Division Multiplexing (OFDM) tones in said forward path data signal. For example, see the following passages and/or figures, as well as all related disclosures: It would have been obvious to combine Minn with one or more of the OFDM Tone Modification references in the base invalidity document to use the Minn approach for estimation to improve an OFDM system.

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two Orthogonal Frequency Division Multiplexing (OFDM) tones in said forward path data signal.	One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly, the OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
2. The method as recited in claim 1, further comprising: receiving said reverse path data signal over at least one reverse transmission path.	Minn discloses receiving said reverse path data signal over at least one reverse transmission path. For example, see the following passages and/or figures, as well as all related disclosures: As disclosed in the discussion in 1[p], Minn teaches receiving reverse path data and using it for channel estimation. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art.
3. The method as recited in claim 2, further comprising: transmitting said modified forward path data signal over at least one forward transmission path.	Minn discloses transmitting said modified forward path data signal over at least one forward transmission path. For example, see the following passages and/or figures, as well as all related disclosures: As discussed in 1[p], the purpose of Minn was to estimate the channel to use for adapting the forward path transmissions. Thus, Minn discloses, or renders obvious, this element.

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	One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
4. The method as recited in claim 1, wherein said reverse path data signal includes at least one type of data selected from a group of different types of data comprising Orthogonal Frequency Division Multiplexing (OFDM) data and Quadrature Phase Shift Keying (QPSK) data.	Minn discloses wherein said reverse path data signal includes at least one type of data selected from a group of different types of data comprising Orthogonal Frequency Division Multiplexing (OFDM) data and Quadrature Phase Shift Keying (QPSK) data. For example, see the following passages and/or figures, as well as all related disclosures: As discussed in 1[p], Minn discloses using OFDM throughout the reference. See pp. 244-245 for discussion of use of QAM symbols which teaches, or renders obvious QPSK data as an alternative. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation and QPSK Usage references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
5. The method as recited in claim 1, wherein said	Minn discloses The method as recited in claim 1, wherein said modified forward path data signal includes at least one type of data selected from a group of different types of data comprising

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modified forward path data signal includes at least one type of data selected from a group of different types of data comprising Orthogonal Frequency Division Multiplexing (OFDM) data and Quadrature Phase Shift Keying (QPSK) data.	Orthogonal Frequency Division Multiplexing (OFDM) data and Quadrature Phase Shift Keying (QPSK) data. For example, see the following passages and/or figures, as well as all related disclosures: As discussed in 1[p], Minn discloses using OFDM throughout the reference. See pp. 244-245 for discussion of use of QAM symbols which teaches, or renders obvious Qpsk data. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification and QPSK Usage references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
6. The method as recited in claim 5, wherein said modified forward path data signal includes sub-carrier pre-equalized OFDM data.	Minn discloses wherein said modified forward path data signal includes sub-carrier pre-equalized OFDM data. For example, see the following passages and/or figures, as well as all related disclosures: See 1[c] One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with

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	one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
7. The method as recited in claim 6, further comprising: generating corresponding Quadrature Phase Shift Keying (QPSK) modulation values based on said sub-carrier pre-equalized OFDM data.	Minn discloses generating corresponding Quadrature Phase Shift Keying (QPSK) modulation values based on said sub-carrier pre-equalized OFDM data. For example, see the following passages and/or figures, as well as all related disclosures: See claim 4. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification and QPSK Usage references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
9. The method as recited in claim 1, wherein said reverse path data signal includes identifiable training data.	Minn discloses The method as recited in claim 1, wherein said reverse path data signal includes identifiable training data. For example, see the following passages and/or figures, as well as all related disclosures: See discussion in 1[p] of pilot and training symbols. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the

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	art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation and Training Data references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
10. The method as recited in claim 9, further comprising: comparing said identifiable training data to a local version of said training data to identify said at least one multipath transmission delay within said reverse path data signal.	Minn discloses comparing said identifiable training data to a local version of said training data to identify said at least one multipath transmission delay within said reverse path data signal. For example, see the following passages and/or figures, as well as all related disclosures: See claim 9 One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation and Training Data references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
12. The method as recited in claim 3, wherein said at least one reverse transmission path is substantially reciprocal to said at least one forward transmission path.	Minn discloses wherein said at least one reverse transmission path is substantially reciprocal to said at least one forward transmission path. For example, see the following passages and/or figures, as well as all related disclosures: See discussion of 1[p], 1[a], 1[b] describing the transmitting device (e.g., for the downlink OFDM symbols) and Minn also determines the pre-equalization parameter for the modification of the forward path (downlink) data signal based on the reverse link ("received" signals).

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	The use of the reverse link channel conditions in Minn to adapt the forward path transmissions discloses this claim. Minn discloses or suggests TDD and using reverse path channel response to predict forward path channel response, which a POSITA would understand to necessarily disclose the limitations of this claim element. Indeed, the '369 acknowledges that reciprocity was already well-known prior to the '369 patent, particularly for TDD channels. See '369 patent at 7:22-34 ("**As is well known**, many materials are electromagnetically isotropic, which is a property resulting from symmetry in their associated permittivity and permeability tensors. The Lorentz Reciprocity Theorem applies to such materials. Refraction and dielectric reflection from materials therefore often show reciprocity, or equivalence of forward and reverse channel characteristics. Diffraction and reflection are inherently reciprocal due to the minimal media affecting the electromagnetic wave. Thus, reciprocity can be used to determine channel characteristics that are used while pre-equalizing a transmitted path. The use of a reciprocal channel is very useful, for example, when Time Division Duplex (TDD) channels are implemented."). One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
13. The method as recited in claim 1, wherein identifying said at least one multipath	Minn discloses wherein identifying said at least one multipath transmission delay, determining said at least one forward path pre-equalization parameter, and modifying said forward path data signal are performed by a transmitting device.

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transmission delay, determining said at least one forward path pre-equalization parameter, and modifying said forward path data signal are performed by a transmitting device.	For example, see the following passages and/or figures, as well as all related disclosures: See discussion in 1[p]. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
14. The method as recited in claim 13, wherein said transmitting device includes a base station device that is operatively configured for use in a wireless communication system.	Minn discloses wherein said transmitting device includes a base station device that is operatively configured for use in a wireless communication system. For example, see the following passages and/or figures, as well as all related disclosures: See discussion in 1[p]. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.

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15. The method as recited in claim 13, further comprising: using at least one transmitting device receive antenna operatively coupled to said transmitting device to receive said reverse path data signal over at least one reverse transmission path from the receiving device.	Minn discloses using at least one transmitting device receive antenna operatively coupled to said transmitting device to receive said reverse path data signal over at least one reverse transmission path from the receiving device. For example, see the following passages and/or figures, as well as all related disclosures: See discussion in 1[p]. A person of ordinary skill in the art would understand that Minn discloses a transmitting devices, such as a base station, that included one or more receive antennas and one or more transmit antennas coupled to the base station to receive and transmit data along the reverse and forward paths. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
19. The method as recited in claim 15, wherein said transmitting device is operatively coupled to a plurality of first device receive antennas.	Minn discloses wherein said transmitting device is operatively coupled to a plurality of first device receive antennas. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this

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	element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
21. The method as recited in claim 15, wherein determining said at least one forward path pre-equalization parameter based on said at least one transmission delay further includes: determining at least one angle of arrival of said reverse path data signal with respect to said at least one transmitting device receive antenna.	Minn discloses wherein determining said at least one forward path pre-equalization parameter based on said at least one transmission delay further includes: determining at least one angle of arrival of said reverse path data signal with respect to said at least one transmitting device receive antenna. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
28. The method as recited in claim 13, further comprising: using at least one transmitting device transmit antenna	Minn discloses using at least one transmitting device transmit antenna operatively coupled to said transmitting device to transmit said modified forward path data signal over at least one forward transmission path to the receiving device. For example, see the following passages and/or figures, as well as all related disclosures:

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operatively coupled to said transmitting device to transmit said modified forward path data signal over at least one forward transmission path to the receiving device.	See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
32. The method as recited in claim 28, further comprising: setting at least one antenna pointing parameter associated with said at least one transmitting device transmit antenna based on said at least one forward path pre-equalization parameter.	Minn discloses setting at least one antenna pointing parameter associated with said at least one transmitting device transmit antenna based on said at least one forward path pre-equalization parameter. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.

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33. The method as recited in claim 28, further comprising: setting at least one phased array antenna transmission directing parameter associated with said at least one transmitting device transmit antenna based on said at least one forward path pre-equalization parameter.	Minn discloses setting at least one phased array antenna transmission directing parameter associated with said at least one transmitting device transmit antenna based on said at least one forward path pre-equalization parameter. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
35. The method as recited in claim 28, further comprising: selecting said at least one transmitting device transmit antenna from a plurality of transmitting device transmit antennas that are each operatively coupled to said transmitting device.	Minn discloses selecting said at least one transmitting device transmit antenna from a plurality of transmitting device transmit antennas that are each operatively coupled to said transmitting device. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the

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	art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
36. The method as recited in claim 35, further comprising: selectively transmitting a plurality of beams using two or more transmitting device transmit antennas.	Minn discloses selectively transmitting a plurality of beams using two or more transmitting device transmit antennas. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
37. The method as recited in claim 36, wherein each of said transmitted plurality of beams is selectively adjusted in phase and amplitude to reduce multipath affects when received by said receiving device.	Minn discloses wherein each of said transmitted plurality of beams is selectively adjusted in phase and amplitude to reduce multipath affects when received by said receiving device. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of

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	the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Antenna Arrays references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.
41. The method as recited in claim 1, wherein determining said at least one forward path pre-equalization parameter based on said at least one transmission delay further includes: sub-band equalizing said forward path data signal using corresponding frequency domain reverse path data.	Minn discloses wherein determining said at least one forward path pre-equalization parameter based on said at least one transmission delay further includes: sub-band equalizing said forward path data signal using corresponding frequency domain reverse path data. For example, see the following passages and/or figures, as well as all related disclosures: See claim 15. One of ordinary skill would find this limitation disclosed either expressly or inherently in the teachings of this reference and its incorporated disclosures taken as a whole, or in combination with the state of the art at the time of the alleged invention. To the extent this reference is not found to teach this element explicitly, implicitly, or inherently, the element would have been obvious to one of ordinary skill in the art based on this reference, common sense, ordinary creativity of one of ordinary skill in the art, and the state of the art. Additionally, it would have been obvious to combine this reference with one or more other prior art references identified in Defendants' Invalidity Contentions Cover Pleading, particularly the Channel Estimation and OFDM Tone Modification references in the base invalidity document. Rather than repeat those disclosures here, they are incorporated by reference into this chart.